

REMARKS

Claims 1-17 were pending in the application; the status of the claims is as follows:

Claims 3 and 14 are withdrawn from consideration.

Claims 1, 2, 4-13, and 15-17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese Published Application No. 2000-247039 (A) to Sugimoto et al ("Sugimoto") in view of Japanese Published Application No. 62-98322 to Matsumoto et al ("Matsumoto"). Please note that the Office Action refers to Japanese Published Application No. 2000-247039 as "Matsuda." However, as Mr. Matsuda is the fourth named inventor, this is improper. Mr. Sugimoto is the first named inventor of this application and this response refers to the application in his name. A machine translation of Sugimoto from the Japanese Patent Office's web site is provided herewith for convenience.

Claims 18-21 have been added to distinctly claim the invention. No new matter has been added.

To date, no Notice of Draftsperson's Patent Drawing Review has been received. Applicant respectfully requests receipt of this document when it becomes available. Please note that the original drawings filed in the patent application are "formal" drawings.

Claims 1 and 13 have been amended to more distinctly specify the claimed invention. These changes are not necessitated by the prior art, are unrelated to the patentability of the invention over the prior art, and do not introduce any new matter.

35 U.S.C. § 103(a) Rejection

The rejection of claims 1, 2, 4-13, and 15-17 under 35 U.S.C. § 103(a), as being unpatentable over Sugimoto in view of Matsumoto, is respectfully traversed based on the following.

Sugimoto describes a process of heating a portion of a thermotropic liquid crystal compound having a cholesteric phase to form an image of a first color (§ 28). A portion of the image can be converted to another color by the application of pressure (§§ 34 and 35).

Matsumoto shows a liquid crystal device having a matrix of leads 13 which can change the color of the liquid crystal 17 by localized heating.

In contrast to the cited references, claim 1 includes:

a first heating process for heating the liquid crystal in a crystal phase to a first temperature that allows the liquid crystal to exhibit a cholesteric liquid crystal phase or an isotropic phase to form an image; and
a second heating process for heating at least a part of an area of the recording medium containing at least a part of an area to a second temperature, wherein:
said second temperature allows the area where the image has been formed by the first heating process to discolor or develop color without external pressure.

The Office Action states that:

Matsumoto is evidence that ordinary workers in the field of liquid crystals would have had the reason, suggestion, and motivation to apply heat to a liquid crystal layer to develop color in order to obtain a distinct picture image display of a thermal writing type liquid crystal.

However, Matsumoto only shows that heating in some unspecified liquid crystal compound can change the color of the liquid crystal. There is no suggestion to one skilled in the art would assume that the change in color caused by heating would be localized to where the image is formed. In addition, there is no suggestion that the heating technique

would provide acceptable results in an LCD compound having a cholesteric phase. There is also no suggestion in either cited reference that heating is an effective substitute for the pressure applied in Sugimoto.

To the contrary, the fact that Sugimoto uses pressure for the color change teaches away from the use of heat for the color change. In Sugimoto, heating steps are required to set the liquid crystal to a cholesteric glass phase and then to set the first selected color of the image. If it would have been obvious to one skilled in the art, the easy mechanism for changing the image to a second selected color would have been to use the heating mechanisms already in place. However, Sugimoto *et al.* did not chose the easy mechanism, but rather they chose to add an additional complex, expensive mechanical device to perform the step of providing pressure to the liquid crystal to cause the second color change. That Sugimoto *et al.* chose to add a complex, expensive mechanism instead of using one that was already necessary and available is strong evidence that using heat for the second color change was not obvious to Sugimoto *et al.*, who were certainly among those skilled in the art. Therefore, claim 1 is not obvious over the cited references. Claims 2 and 4-9 are dependent upon claim 1. A claim that depends from a non-obvious claim is also non-obvious. MPEP §2143.03.

Also in contrast to the cited references, claim 10 includes:

a first process for selectively setting portions of the liquid crystal in a crystal phase and a fixed phase and thus forming an image on the thermosensible recording medium; and

a second process for discoloring or developing a color of at least a part of the portion(s) set in the fixed phase thus discoloring or developing a color of at least a part of the image.

As noted above, the cited references do not show or suggest using a heating step to convert a portion of an image formed in a thermosensitive recording medium to another color. Therefore, claim 10 is not obvious over the cited references. Claims 11 and 12 are dependent upon claim 10, and thus are also non-obvious.

Also in contrast to the cited references, claim 13 includes:

heating an area of the medium to at least a first temperature for transitioning the liquid crystal from a crystal phase to a cholesteric liquid crystal phase; and
changing a color of a portion of said area by heating said portion to a second temperature lower than said first temperature;
said second temperature allows the area where a crystal phase has been transitioned by the heating of the first temperature to change a color without external pressure.

As noted above, the cited references do not show or suggest using a heating step to changing a portion of an area having a first color. In addition, as there is no suggestion for a second heating step to change a color of an area, there can be no suggestion in the cited references of a relationship between the first and second temperatures as claimed. Therefore, claim 13 is not obvious over the cited references. Claims 15-17 are dependent upon claim 13, and thus are also non-obvious.

Accordingly, it is respectfully requested that the rejection of claims 1, 2, 4-13, and 15-17 under 35 U.S.C. § 103(a) as being unpatentable over Matsuda in view of Matsumoto, be reconsidered and withdrawn.

New claim 18 includes:

a first heating process for heating the liquid crystal in a crystal phase to a first temperature that allows the liquid crystal to exhibit a cholesteric liquid crystal phase or an isotropic phase to form an image; and
a second heating process for heating whole of an area of the recording medium containing at least a part of an area where the image has been formed to allow at least a part of the image to discolor or develop a color.

As noted above, the cited references do not show or suggest a second heating process for changing the color of a part of an image set by a prior heating step in a liquid crystal having a cholesteric phase. Therefore, claim 18 is patentably distinct from the

cited references. Claim 19 is dependent upon claim 18 and thus includes every limitation of claim 18. Therefore, claim 19 is also patentably distinct from the cited references.

New claim 20 includes:

a first heating process for heating the liquid crystal in a crystal phase to a first temperature that allows the liquid crystal to exhibit a cholesteric liquid crystal phase or an isotropic phase to form an image; and

a second heating process for heating whole of an area of the recording medium containing at least a part of an area to a second temperature, wherein:

said second temperature allows the area where the image has been formed by the first heating process to discolor or develop a color without external pressure.

As noted above, the cited references do not show or suggest a second heating process for changing the color of a part of an image set by a prior heating step in a liquid crystal having a cholesteric phase. Therefore, claim 20 is patentably distinct from the cited references.

New claim 21 includes:

heating an area of the medium to at least a first temperature for transitioning the liquid crystal from a crystal phase to a cholesteric liquid crystal phase; and

changing a color of all or a portion of said area by heating said portion to a second temperature lower than said first temperature.

As noted above, the cited references do not show or suggest a second heating process for changing the color of all or a part of an area set by a prior heating step in a liquid crystal having a cholesteric phase. Therefore, claim 20 is patentably distinct from the cited references.

CONCLUSION

Wherefore, in view of the foregoing amendments and remarks, this application is considered to be in condition for allowance, and an early reconsideration and a Notice of Allowance are earnestly solicited.

This Amendment increases the number of independent claims by 3 from 3 to 6 and increases the total number of claims by 4 from 17 to 21 (20 claims previously paid for), but does not present any multiple dependency claims. Accordingly, a Response Transmittal and Fee Authorization form authorizing the amount of \$276.00 charged to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260 is enclosed herewith in duplicate. However, if the Response Transmittal and Fee Authorization form is missing, insufficient, or otherwise inadequate, or if a fee, other than the issue fee, is required during the pendency of this application, please charge such fee to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260.

Any fee required by this document other than the issue fee, and not submitted herewith should be charged to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260. Any refund should be credited to the same account.


If an extension of time is required to enable this document to be timely filed and there is no separate Petition for Extension of Time filed herewith, this document is to be construed as also constituting a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) for a period of time sufficient to enable this document to be timely filed.

Any other fee required for such Petition for Extension of Time and any other fee required by this document pursuant to 37 C.F.R. §§ 1.16 and 1.17, other than the issue fee,

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Deposit Account No. 18-1260. Any refund should be credited to the same account.

Respectfully submitted,

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